

STUDIES OF THE ICACINACEAE, II  
HUMIRIANTHERA, LERETIA, MAPPIA AND NOTHAPODYTES,  
VALID GENERA OF THE ICACINEAE

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*With four plates*

THE four genera considered here have been treated at various times and by various authors as one. They belong to that general group of the Icacineae having free petals which are pilose on the inside. This contribution is an attempt to clarify the problem by redefining the genera and by incorporating new lines of evidence taken from studies of the wood, pollen and fruits.

*Humirianthera* is a distinct genus. The limits of the remaining genera have been drawn in various manners. Baillon (*Adansonia* **3**: 367. 1862-3) considered them all as synonymous with  *Icacina*. Bentham and Hooker (*Gen. Pl.* **1**: 351. 1862), Engler (*Mart. Fl. Bras.* **12**(2): 50. 1872) and House (*Amer. Midl. Nat.* **8**: 62. 1922) have considered them under either *Mappia* or *Leretia*. In Baehni's recent monograph the *Mappia* complex has been divided. The Old World species were placed in the newly proposed genus *Neoleretia* while the New World species were retained in the emended genus *Mappia*. Baehni acknowledged *Mappia* of Jacquin to be an invalid name; however, since its predecessors are also invalid, he proposed the name be added to the list of *nomina conservanda*. Baehni, however, misinterpreted the genus *Nothapodytes* Blume, which other workers have shown to be made up of the Asiatic species of "*Mappia*." Recently, Sleumer (*Notizbl.* **15**: 247. 1940) has rejected Baehni's genus *Neoleretia* and transferred most of the species to *Nothapodytes*. This appears to be the correct procedure. Applying strict priority Sleumer also rejected the name *Mappia* Jacq. as a later homonym and took up the name *Leretia* Vell. for the American species. Before his paper appeared, the name *Mappia* Jacq. had been published in the official supplementary list of additions to the *nomina conservanda* in the *Kew Bull.* for July 1940.

Baehni and Sleumer have placed all the New World species of the *Mappia* complex in one genus. With this I do not agree. At least *Leretia cordata* (including *L. Vellozii*, *L. nitida*, and *L. Poeppigiana*) cannot belong in the genus *Mappia*, as differences are found in the wood, pollen grains, fruits, and centers of distribution.

The segregation of the *Mappia* complex accepted here is not new. Miers (*Ann. Mag. Nat. Hist.* II. **9**: 392. 1852) and Engler (*Nat. Pflanzenfam.* III. **5**: 249. 1893) have both considered *Mappia* and *Leretia* distinct. Baehni has pointed out the differences between the Old and New World

groups. There has been, however, no critical comparison of these genera and no attempt to tabulate their differences. This I have supplied in the present paper.

A complete synonymy and history of the group was given in Baehni's work.

### Survey of the diagnostic generic characters

#### **Lereticia** Vellozo

Lianas; inflorescent axillary; pedicels bracteate; calyx lobed; filaments arcuate, attached dorsally, connective linear, usually extended beyond the anther sacs to an inconspicuous tip; pistil usually with two abortive styles, ovary with a glabrous columniform base, pubescent in the locule, disk absent; fruit large, mesocarp thin and dry, putamen thin, pubescent inside, funicle in a tubular canal in the putamen; cotyledons folded, wrinkled, not displaced laterally, their margins superimposed.

#### **Mappia** Jacquin

Trees; inflorescence axillary; pedicels ebracteate; leaves commonly with dorsally axillary pores; calyx toothed; filaments attached to the base of the connective; pistil symmetrical, disk fleshy foliaceous; fruit with fleshy mesocarp, endocarp moderately thick, funicle in the mesocarp; cotyledons flat, not displaced laterally, their margins superimposed.

#### **Nothapodytes** Blume

Trees; inflorescence terminal; pedicels ebracteate; calyx toothed; filaments attached dorsally to the connective and fused with a cushion formed of apparently reflexed basal lobes of the anther sacs; pistil symmetrical, disk fleshy foliaceous; fruit with fleshy mesocarp, putamen thin, funicle in the mesocarp; cotyledons flat, laterally displaced, their margins not superimposed.

#### **Humirianthera** Ducke

Lianas; inflorescence terminal or falsely lateral; pedicels bracteate; calyx deeply lobed; filaments attached dorsally, connective triangular, extended beyond the globose anther sacs to a tapering apex; pistil with an acentric style, disk lacking; fruit large with a thick woody putamen, funicle in a tubular canal; cotyledons frequently folded, not displaced laterally, their margins superimposed.

Of these four genera *Humirianthera* is the most distinct. In their treatments of the other genera of the *Mappia* complex, previous workers have placed too much emphasis on the form and pubescence of the calyx. A study of considerable material shows that the characters that have been emphasized are extremely variable. There are, however, reliable differences in the stamens which have been overlooked. The differences in the method of attachment of the filaments and anthers are of value in readily distinguishing the genera. In *Nothapodytes* the connective is short, so that the filament appears to be attached near the middle of the anther. Furthermore, the extension of the anther sac tissue in a reflexed basal lobe is unusual and quite diagnostic. Elongation of the filament before the flower opens causes it to arch behind the anther while the basal portion of the filament remains strict. *Mappia* and *Lereticia* are quite in contrast to this. *Mappia* has the filament attached basally to the connective and there is no

arching of the filament. Here elongation in bud condition causes contortion of the filament below the anther. The filaments of *Leretia* are more slender and are attached dorsally to a linear connective which commonly projects beyond the anther sacs in a small tip. Elongation of the filaments in *Leretia* produces an abaxial arching similar to that found in *Nothapodytes*.

The pistil in *Mappia* and *Nothapodytes* has a terminal style and is quite symmetrical. In *Leretia* the pistil is asymmetrical with a slightly acentric style. Frequently two papillae or presumably rudimentary styles are present. A fleshy foliaceous disk subtends the ovary in *Nothapodytes* and in *Mappia*. *Leretia* has a columniform, at times hairy, base to the pistil and some authors have called this a "disk." *Leretia* also differs from the other genera by having long tangled hairs on the inside of the locule. These are present in the mature fruit as long sparse smooth-walled usually straight hairs. These hairs are not present in *Mappia* and *Nothapodytes*.

The fruit of the Icacinaceae is typically a drupe with a sclerified putamen. In each cell only one pendant anatropous seed is developed from the two ovules. In the genera of the family having the liana habit, generally speaking, the funicle is enclosed in the putamen. In the other genera of the family, the funicle may lie between two projecting ridges of the putamen in mesocarp tissue or it may lie free in the mesocarp. In all the specimens of *Leretia* that I have examined, the funicle travels up the putamen in a special tubular canal until near the apex, where it enters the locule. In *Mappia* and *Nothapodytes* the funicle, in the material I have studied, is never enclosed in the putamen, although two projecting ridges lateral to it may be developed. The funicle may, however, enter the putamen and travel in a tubular canal a short distance before making an abrupt turn and entering the locule. Whether enclosed in the putamen or free in the mesocarp, the funicle lies on the margin in those fruits that are slightly flattened. In contrast to this, the raphe is always found on the broad face of the seed. In other words, an adjustment of 90° exists between the position of the funicle and the raphe. The raphe is generally strap-shaped and terminates in a flattened circular chalaza at the end of the seed opposite the micropyle. This is true of all genera of the family in which the fruits have been studied.

The axillary inflorescences found in *Mappia* and *Leretia* distinguish these genera from *Nothapodytes*, in which the inflorescence is terminal. The flowers are articulated to the pedicels immediately below the calyx in all genera of the *Mappia* complex. *Leretia* differs from *Nothapodytes* and *Mappia*, however, by having small bracts at the top of the pedicel. *Nothapodytes* and *Mappia* are without bracts.

The pores in the axils of the veins and midrib on the lower surface of the leaves of several species of *Mappia* have been mentioned by previous workers. These appear to be quite similar to those found in some of the South American species of *Citronella* (Howard, Jour. Arnold Arb. **21**: 478. 1940). I have not been able to find mites in these, as are so commonly found in *Citronella*. Likewise, in *Mappia* the pores are without internal hairs.

The specimens used in this study and cited in this current paper are from the herbaria of the Arnold Arboretum (A); Field Museum of Natural History (FM); Gray Herbarium (G); New York Botanical Garden (NY); Atkins Institution of the Arnold Arboretum, Soledad, Cuba (So); and the United States National Museum (US).

### **Leretia** Vellozo

**Leretia** Vellozo, Fl. Flum. 99. 1825, Fl. Flum. Ic. **3**: t. 2. 1827; Bentham, Trans. Linn. Soc. **18**: 680. 1838; Miers, Ann. Mag. Nat. Hist. II. **9**: 392. 1852, III. **4**: 364. 1859; Valetton, Crit. Overz. Olac. 184. 1886; Engl. Nat. Pflanzenfam. III. **5**: 250. 1893.

Lianas (or shrubs and small trees with eventually scandent branches), lenticels inconspicuous; leaves alternate, short-petioled, the petioles shallowly canaliculate, the margins entire, slightly revolute; inflorescences axillary much-branched cymes or panicles, pedunculate; flowers articulated to short bracteate pedicels, perfect or rarely unisexual by abortion, the five calyx lobes subacute to rounded; petals (4–)5, free, valvate with inflexed tips; stamens (4–)5, free, filaments filiform, arcuately attached dorsally, the connective extended into an inconspicuous tip, the anthers oblong, introrse, longitudinally dehiscent; pistil asymmetrical usually with two abortive styles, functional style glabrous, the stigma capitate, the ovary hirsute with a columniform base which is also frequently hirsute, one-celled; ovules two, pendant from the apex, anatropous; fruit drupaceous, glabrate, ovoid-ellipsoid, slightly flattened, apex obliquely umbonate, mesocarp scarcely fleshy, the putamen tenuous, smooth; seed one, albuminous, the embryo with wrinkled cotyledons which are not displaced but have their margins superimposed.

TYPE SPECIES: *Leretia cordata* Vell.

DISTRIBUTION: Brazil, British Guiana, and Peru.

**Leretia cordata** Vell. Fl. Flum. 99. 1825.

*Leretia Vellozii* Miers, Ann. Mag. Nat. Hist. II. **9**: 392. 1852, III. **4**: 364. 1859.

*Leretia nitida* Miers, Ann. Mag. Nat. Hist. III. **4**: 365. 1859.

*Mappia cordata* Engl. in Mart. Fl. Bras. **12**(2): 50. 1872.

*Mappia nitida* Engl. in Mart. Fl. Bras. **12**(2): 51. 1872.

*Mappia Poeppigiana* Baill. Adansonia **11**: 175. 1874.

*Icacina* (?) *Poeppigiana* Valetton, Crit. Overz. Olac. 187. 1886.

*Leretia Poeppigiana* Sleumer, Notizbl. **15**: 245. 1940.

Branches terete to angular, red-brown in color, appressed short-strigose-pubescent, becoming glabrate, the older branches with dark brown corky bark; leaves alternate, petioles stout, commonly twisted, 0.8–1.5 cm. long, densely chestnut strigose-pubescent below, becoming glabrate, corky at maturity; lamina ovate-lanceolate to oblong or elliptic, 10–19 cm., rarely 30 cm. long, 4–12 cm. broad, apex acute with an apiculate point to rounded or obtuse, base acute or rounded, dark green above and frequently shining, commonly lighter below, the upper surface sparsely short white pilose-pubescent, soon becoming glabrate, lower surface commonly with white or yellowish malpighiaceus hairs with almost equal arms, rarely with weak stellate clusters of pilose hairs, midrib prominent, stout, strigose-pubescent, sulcate above, the veins 6–8 on each side, prominent, gracefully arcuate, anastomosing near margin to form a complex reticulum, with numerous

less prominent interpolated veins; inflorescence to 18 cm. long and 10 cm. wide, the peduncles and pedicels densely golden strigose-pubescent, the pedicels 2–4 mm. long, bracteate, the bracts ovate, acute, strigose-pubescent; calyx 2 mm. in diameter, patelliform, lobes or teeth 0.5–0.8 mm. high, densely golden hirsute or strigose; petals lanceolate-ovate or oblong, 2.5–3.4 mm. long by 1.5–2 mm. broad in bud, 4.8–5.5 mm. long and 1.8–2 mm. broad at maturity, the midrib moderately well developed, densely hirsute outside, inside long-pilose or tomentose, the inflexed apex glabrous; stamens 4–4.5 mm. long, the anthers 0.7–1 mm. long; ovary 1.5 mm. in diameter at anthesis, the locule densely hirsute or tomentose inside, the functional style 2–2.5 mm. long, the rudimentary styles rarely exceeding 0.3 mm. in length; fruit 3.5–4.5 cm. long, 2–2.5 cm. wide and 1.5–2 cm. thick, the base acute or tapering, the apex acute, hirsute when young but glabrate at maturity, the putamen papery, scarcely woody, sparsely pubescent inside with long pilose hairs; seed pendant from near the apex, to 2.5 cm. long, 1.5 cm. wide, 1 cm. thick, the raphe traveling obliquely down the seed to a circular chalaza near the base, the embryo one-half to two-thirds the length of the seed, to 1.3 mm. long, the cotyledons oval to obovate, to 1 cm. wide, apex rounded, venation rapidly dichotomizing at base, the radicle minute, 1 mm. long, cylindrical.

TYPE LOCALITY: Pará, Brazil.

ILLUSTRATIONS: Vellozo, Fl. Flum. Ic. **3**: t. 2. 1827; Miers, Contrib. **1**: t. 7, as *L. Vellozii*. 1851–61; Engl. in Mart. Fl. Bras. **12**(2): t. 11, as *L. nitida*. 1872; Valetton, Crit. Overz. Olac. pl. 5, fig. 29, as *L. cordata*. 1886, fig. 30, as *L. nitida*. 1886; Engl. Nat. Pflanzenfam. III. **5**: fig. 139, D–F, as *L. nitida*. 1893; Baehni, Candollea **7**: pl. 4, fig. 1, A–B, as *M. cordata*; fig. 1, C, as *M. Poeppigiana*. 1936.

DISTRIBUTION: Brazil, British Guiana, Peru.

BRAZIL: A m a z o n a s : Near mouth of Rio Embira, *Krukoff* 5021 (A, NY); B a h i a : *Blanchet* 2347 (FM); P a r á : Boa Vista on Tapajos River, *Dahlgren and Sella* 158 (FM). BRITISH GUIANA: Northwest slopes of Kanuku Mts., drainage of Moku-moku creek, *Smith* 3591 (G, NY); Kamakusa, upper Mazaruni river, *La Cruz* 4235 (FM, G, NY, US); Waini river, Northwest district, *La Cruz* 3794 (NY). PERU: L o r e t o : Puerto Arturo, lower Río Huallaga, *Killip and Smith* 27869 (FM, NY, US); Mishuyacu, near Iquitos, *Klug* 345 (FM, US), *Klug* 641 (FM, NY, US), *Klug* 666 (FM, NY, US), *Klug* 1215 (NY); Balsapuerto, *Klug* 2967 (A, FM, G, NY, US); Caballo-Cocha, *Williams* 2067 (FM), *Williams* 2055 (FM, US), *Williams* 2084 (FM); Iquitos, *Williams* 3541 (FM); S a n M a r t í n : Tarapoto, *Spruce* 4492 (FM photo. NY); Juan Jui, Río Huallaga, *Klug* 3892 (FM, G, NY, US); Tarapoto, *Williams* 6042 (FM, US); Maynas, *Poeppig* 2329 (FM photo). P e r u - C o l o m b i a b o u n d a r y : Río Putumayo, *Klug* 1633 (A, FM, G, NY, US).

NATIVE NAME: Puca yacu (Williams).

As Baehni points out, there are no significant differences between *L. nitida* and *L. cordata*, and they must be considered as identical. However, Baehni does distinguish between *M. cordata* and *M. Poeppigiana* on the shape of the leaf; the base being acute in the former and not acute in the latter. I have been able to examine more material than he cites and find that this distinction, along with that of the size of the leaf, is not a consistent one. The plants are lianas or small trees with scandent branches and, as such, one might expect the enormous leaf variation that is present. The range of leaf size and shape claimed for the species which have been proposed can be found in a single collection (*Klug* 2967 or *Krukoff* 5021) and frequently

on a single sheet (*Smith 3591*, NY). In these, the mature leaves may vary from 10 to 28 cm. in length and the base from acuminate to rounded or subcordate. For this reason I also place *M. Poeppigiana* in the synonymy of *L. cordata*. The other name, *L. Vellozii*, was supplied by Miers when he considered the epithet *cordata* to be inappropriate.

In Baillon's original description of *M. Poeppigiana* he cites the flowers as being polygamous. In most of the specimens that I have seen the flowers are perfect; however, there is a strong tendency for reduction of the pistil to a condition where there are three almost uniform styles. When this occurs the stamens are usually stouter and the pollen very abundant in the anthers. On the other hand, certain flowers show a tendency to reduce the stamens to poorly developed structures with very little pollen in the anther sacs. In these instances, the pistil usually has one well developed style with two rudiments scarcely evident.

Some of the previous monographers of this genus have interpreted the glabrous cylindrical or columniform base that is frequently present on the ovary as a disk and have considered it comparable to that found in *Mappia*. Examination of considerable material easily shows that such is not the case. The tissue of this base is not distinguishable from the rest of the ovary and very commonly is reduced in size and is scarcely evident.

The occurrence of hairs in the locules of this genus is unusual among the fruits of this family. I have found them only in *Ottoschulzia* among other genera. In the flowering condition the hairs are widely separated, long, and usually straight. The walls of these hairs are smooth and quite thick and their bases are usually enlarged.

### Species Excluded

*Leretia glabrata* Sleumer, Notizbl. **15**: 245. 1940 probably = **Pleurisanthes parviflora** (Ducke) Howard.

Sleumer compares his new species with *L. parviflora*, which I had previously referred to the genus *Pleurisanthes*. It seems strange that Sleumer did not recognize this relationship, since he also described a new species of *Pleurisanthes*. Nevertheless *L. glabrata*, according to Sleumer's description, does not have the characters of the genus *Mappia* (*Leretia* sensu Sleumer), as the pedicels are bracteate and the petals are glabrous within. Sleumer does not mention a foliaceous disk, nor does he describe an articulation below the calyx, both of which are also characteristic of *Mappia*.

From the description given I cannot distinguish *L. glabrata* from *Pleurisanthes parviflora* and so, until I can examine the type, I tentatively refer Sleumer's species to the synonymy of *Pleurisanthes parviflora*.

*Leretia paniculata* Mart. Fl. Bras. **7**: 17. 1856 = **Citronella paniculata** (Mart.) Howard, Jour. Arnold Arb. **21**: 473. 1940.

*Leretia parviflora* Ducke, Arch. Jard. Bot. Rio **4**: 119. 1925 = **Pleurisanthes parviflora** (Ducke) Howard, Jour. Arnold Arb. **21**: 482. 1940.

### Mappia Jacquin

**Mappia** Jacquin, Hort. Schoenbr. **1**: 22, t. 47. 1797; Kew Bull. **1940**: 111. 1940, as *nomen conservandum*; Miers, Ann. Mag. Nat. Hist. II. **9**: 393, in part. 1852;

Contrib. **1**: 62, in part. 1851-61; Baillon, *Adansonia* **3**: 367. 1862-3; Hist. Pl. **5**: 328, in part. 1874; Engl. Nat. Pflanzenfam. III. **5**: 249. 1893; Baehni, Compt. Rend. Soc. Phys. Hist. Nat. Genève **53**(1): 33. 1936; Candollea **7**: 171, in part. 1936.

Trees and shrubs; branches terete; leaves alternate, petiolate, the petioles shallowly sulcate, the lamina entire, the margin slightly revolute, commonly with pores in the axils of the veins on the dorsal surface; inflorescence axillary, cymose or corymbose, the flowers articulated to short ebracteate pedicels; flowers perfect, 5-parted, the calyx patelliform, minutely toothed; petals valvate, strigose or glabrate outside, villose inside, inflexed apex short, glabrous; stamens free, the anther sacs oblong, longitudinally dehiscent, introrse, filament basally attached, not arcuate, filiform, fleshy, scarcely flattened; pistil symmetrical, the ovary hirsute or glabrous, the disk fleshy, hirsute or glabrous on the margin and inside but always glabrous outside, the ovary one-celled; ovules two, anatropous, pendant from the apex of the locule; drupe with a thin putamen, seed one, albuminous, the cotyledons not displaced laterally, their margins superimposed.

TYPE SPECIES: *Mappia racemosa* Jacq.

DISTRIBUTION: Greater Antilles, Mexico, Panama.

#### Key to the species

Ovary and disk glabrous; petals glabrous outside; inflorescence to two-thirds the length of the oblanceolate leaves ..... *M. mexicana*

Ovary at least sparsely pubescent; petals pubescent outside at least at the apex.

Leaves narrowly lanceolate, without pores in the axils of the veins on the lower leaf surface; petals lanceolate; disk glabrous; pistil densely hirsute. . . . . *M. angustifolia*

Leaves broadly lanceolate or oblanceolate; pores present in the axils of veins; petals oblong; disk densely hirsute inside and on the margins or glabrate; pistil densely hirsute to glabrous ..... *M. racemosa*

**Mappia mexicana** Robins. & Greenm. Amer. Jour. Sci. III. **50**: 150. 1895; Standley, Contr. U. S. Nat. Herb. **23**: 689. 1923; Baehni, Candollea **7**: 176. 1936.

*Leretia mexicana* Sleumer, Notizbl. **15**: 245. 1940.

Shrub 1.5-3 m. in height; branches terete, youngest stems sparsely pilose; petioles 5-8 mm. long, strigose to pilose, densely so in the sulca; lamina subcoriaceous, oblanceolate or oblong-obovate, 7.5-10.5 cm. long, 1.5-3.5 cm. broad, short-acuminate to rounded or obtuse at apex, cuneate at base, glabrous and shining above, when young sparsely pilose below at least towards base and becoming glabrate, the veins 6-7 pairs, weakly developed, slightly arcuate, anastomosing at margins; inflorescence with peduncles 2-6 cm. long, sparsely pilose, with several strigose bracts on the lower portion, the corymbs many-flowered, 2-3 cm. in diameter, the pedicels 1-2 mm. long, frequently glabrous, ebracteate, the calyx sparsely strigose or frequently glabrous, minutely toothed; petals moderately fleshy, oblong, 3-3.2 mm. long, 1-1.2 mm. broad at maturity, glabrous without, glabrate within or sparsely villose, the inflexed apex very short; stamens 2.5-3 mm. long, the anthers oblong, 1-1.2 mm. long, the anther sacs parallel, the filaments slightly flattened, the connective frequently extended to an inconspicuous tip; pistil 2 mm. in diameter at anthesis, glabrous, the style scarcely evident, the stigma capitate, the disk fleshy, 5-lobed, glabrous; fruit ovoid or ellipsoid, 1-5 cm. long, 1 cm. wide and 0.7 cm. thick, slightly flattened, apex slightly umbonate, base rounded or truncate, the funicle in the mesocarp, crescent-shaped in section; seed 1 cm. long, 0.7 cm. wide and

0.5 cm. thick, the raphe strap-shaped, the embryo three-quarters the length of the seed, the cotyledons ovate, 5 mm. long, the radicle cylindrical, 2 mm. long.

TYPE LOCALITY: Micos, San Luis Potosí, Mexico.

ILLUSTRATION: Plate I.

DISTRIBUTION: Mexico.

MEXICO: San Luis Potosí: Micos, *Pringle 5094* (A, G); Tamaulipas: Tampico, *Pringle 6645* (A, G, NY, US), *Palmer 69* (US).

Robinson and Greenman based their species on a specimen cited "*Pringle 5494*." Baehni also cites this number as examined. Miss Davis cited that number as *Inga laurina* Willd. and this has been verified in the Gray Herbarium. The specimen of *Mappia mexicana* in the Gray Herbarium, which is presumably the type, bears the number 5094 and is listed as such by Davis (*Life and Work of C. G. Pringle 547*, 1936).

Superficially the two Pringle collections examined are strikingly different in leaf shape and the length of the peduncle. In addition, *Pringle 6645* has the inner surface of the petals persistently pubescent while *Pringle 5094* is glabrate. The petals are fleshy in both and frequently have a waxy outer surface. They commonly turn blue on drying. The stamens are unique in that frequently the anther sacs will drop off after maturing, so that the old flowers will have erect filaments and connectives with no indications of the anther sacs. The connective is longer than that of most species of *Mappia* and frequently extends to a small apex or point beyond the anther sacs; it is narrow and scarcely separates them. The filament is attached, slightly abaxially, to the base of the connective. The description of the fruit was compiled from the Palmer collection.

Baehni saw in this species a close relationship with the Old World species of *Nothapodytes*. However, more complete study shows its true relationship is with *Mappia racemosa* of the Antilles.

***Mappia angustifolia*** Griseb. Cat. Pl. Cub. 119. 1866.

*Leretia angustifolia* House, Amer. Midl. Nat. 3: 62. 1922.

Shrub, the branches pubescent; petioles 0.8–1.2 cm. long, strigose, densely so in the sulca; lamina narrowly lanceolate, 7–11 cm. long, 1.2–1.5 cm. broad, attenuate at both ends, apex rounded, base cuneate, chartaceous, glabrous and shining above, sparsely pubescent below with malpighiaceus hairs with unequal arms, the midrib prominent, strigose, the veins very weakly developed, arching, anastomosing towards margin, without axillary pores; inflorescence 3–4 cm. long, cymose, few-flowered, axis strigose to pilose; calyx patelliform, membranaceous, five-toothed, sparsely pilose; petals lance-oblong, 4–4.2 mm. long, 1 mm. broad at maturity, weakly pilose on the upper third without, villose within, densest on the lower portion, the apex inflexed, glabrous, to 0.8 mm. long; stamens 3–3.2 mm. long at maturity, the anthers 1 mm. long, the anther sacs slightly diverging at base; pistil 2 mm. high at anthesis, the ovary densely hirsute, the style short, the stigma oblique, capitate, the disk fleshy, five-lobed, glabrous; fruit unknown.

TYPE LOCALITY: Oriente province, Cuba.

ILLUSTRATIONS: Plate II, figs. 1–3.



DISTRIBUTION: Cuba.

CUBA: Oriente: near Saltadera, Sept. 20, 1860, *Wright 2638* (G).

Wright's collection is the only one I have seen referred to this species. It is easily recognized by its narrow leaves, the absence of axillary pores, the few-flowered inflorescence, and the glabrous ovarian disk. Wright reported the flowers to be a greenish-white color.

Wright and Sauvalle (*Fl. Cub.* 21. 1873) have placed this species in the synonymy of *M. racemosa*. From a study of this single collection of *M. angustifolia* and a large number of specimens of *M. racemosa* I can only conclude that there are good differences between them.

**Mappia racemosa** Jacq. Hort. Schoenbr. **1**: 22. 1797; Miers, Ann. Mag. Nat. Hist. III. **9**: 394. 1852; Griseb. Fl. Brit. West Indies **1**: 310. 1860; Fawcett and Rendle, Fl. Jam. **5**: 39. 1926; Baehni, Candollea **7**: 175. 1936.

*Icacina dubia* Macf. Fl. Jam. **1**: 122. 1837.

*Leretia racemosa* House, Amer. Midl. Nat. **8**: 62. 1922.

*Mappia affinis* Miers, l.c. 395. 1852; Contrib. **1**: 64. 1851-61.

A large bush or tree to 11 m. high, trunk diameter to 30 cm., the branches glabrous, terete or angular; petioles 12-25 mm. long, slightly strigose in the sulca, becoming glabrate; lamina lanceolate, oblanceolate or oblong, 10-19 cm. long, 3-5 cm. broad, apex acuminate to sharp-pointed or rounded, base acute to cuneate, glabrous, thinly coriaceous, dark green, rarely shining above, lighter below, the midrib canaliculate above, prominent below, the veins 7-9 pairs, inconspicuous above, weakly developed below, diverging obliquely, scarcely arcuate except near margin, inconspicuously anastomosing, the axillary pores more or less developed; inflorescence cymose or corymbose, the peduncles one and one-half to several times the length of the petiole, densely pilose to glabrate, bearing several spirally arranged densely hirsute bracts at the base, few- to many-flowered, the pedicels short; calyx patelliform, five-toothed, sparsely strigose with the hairs usually aggregated at the teeth, 1.5-2 mm. in diameter, 0.3-0.8 mm. high; petals lanceolate to oblong, reflexed, 3-4.5 mm. long and 0.9-1.1 mm. broad at maturity, densely strigose to glabrate without, within abundantly pilose or hirsute, the hairs frequently aggregated in the lower third, inflexed apex glabrous; stamens 2.5-4.5 mm. long at maturity, the filament rarely flattened at base, the anthers oblong, 1 mm. long, slightly diverging at base, the connective two-thirds the length of the anther; pistil 2-3 mm. high at anthesis, densely hirsute to glabrate, the stigma capitate, truncate to oblique, frequently bilobed, the style short, glabrous, the disk fleshy, hirsute on the edge and within and glabrous without to glabrate; lobes 0.2-0.3 mm. high; fruit ellipsoid, 1.4-1.6 cm. long, 0.9-1.1 cm. wide, tapering to the base or rounded, apex umbonate, mesocarp moderately fleshy or fibrous, the putamen smooth or slightly rugose; seed to 11 mm. long, the embryo nearly equal to the length of the seed, the cotyledons ovate, strongly palmately trinerved, the radicle short, conical or cylindrical, the endosperm with abundant oil cells.

#### Key to the varieties

- Fruit 1.7-2.5 cm. long, ellipsoid, tapering at base, mesocarp fibrous, not fleshy; leaves lanceolate, acuminate to a sharp pointed apex; pistil and disk usually glabrous or sparsely pubescent ..... var. *typica*  
 Fruit 1.2-1.7 cm. long, globose, base rounded, mesocarp fleshy; leaves oblanceolate, apex rounded or acute with rounded tip; pistil and disk hirsute. . var. *brachycarpa*

**Mappia racemosa** var. **typica** var. nov.

Leaves lanceolate, apex acuminate to a sharp rarely rounded tip; inflorescence at least twice the length of the petiole, sparsely pubescent to glabrate; petals sparsely pubescent without; pistil essentially glabrate, disk usually glabrate; fruit ellipsoid, apex acute with an umbonate tip, base tapering, mesocarp fibrous, not very fleshy.

TYPE LOCALITY: Jamaica.

ILLUSTRATIONS: Jacq. Hort. Schoenbr. **1**: t. 47. 1797; Valetton, Crit. Overz. Olac. pl. 5, fig. 25. 1886; Baehni, Candollea **7**: pl. 4, fig. 1, D-E. 1936.

DISTRIBUTION: Jamaica, Cuba (Oriente), Porto Rico, Panama (?).

JAMAICA: Green Valley, *Harris 5387* (US), *Harris 6511* (FM, NY); Peckham woods, Upper Claredon, *Harris 11193* (NY); Schwallenburgh, St. Ann, *Harris 7043* (A, G, NY, US); Grier park, St. Ann, *Alexander* (ex Herb. Prior, NY); Santa Cruz Mts., Stauruane Hills, *Britton 1304* (NY); without locality, *Hart 575* (US), *MacFayden* (G). CUBA: Oriente, Josephina, Hiazó, *Wright 1578*<sup>1</sup> (G, US); locality not determined, *Wright 1389* (NY). PORTO RICO: *N. L. and E. G. Britton 9911* (NY). PANAMA: Bocas del Toro, region of Almirante, Flat Rock, *Cooper 563* (FM, NY, US).

**Mappia racemosa** var. **brachycarpa** Griseb. Cat. Pl. Cub. 119. 1866.

*Leretia racemosa* (Jacq.) House var. *brachycarpa* (Griseb.) Sleumer, Notizbl. **15**: 245. 1940.

Leaves oblanceolate, apex rounded or acute with rounded tip, base cuneate; inflorescence rarely twice the length of the petioles, usually strigose to pilose; petals densely to sparsely strigose without, densely pilose within; pistil densely hirsute, disk hirsute on the margin and frequently so within, rarely sparsely pubescent; fruit globose or slightly flattened, apex rounded and slightly umbonate, base rounded, the mesocarp fleshy.

TYPE LOCALITY: Cuba.

ILLUSTRATIONS: Plate II, figs. 4-13.

DISTRIBUTION: Cuba, Haiti (?).

CUBA: Oriente: *Wright 1578* (G), Farallon de la Perla, *Wright 1389* (G, NY), *Shafer 8770* (NY); Sierra Maestra, *Leon 10981* (NY). Santa Clara: Guabairo, Soledad, Cienfuegos, *Jack 6902* (A, NY, So), Buenos Aires, Trinidad Hills, *Jack 6979* (A, NY, So), *Jack 7233* (A, So, US), *Jack 8068* (A, NY, So, US). Havana: Valley Río Bacuranao, *Wilson and Leon 11608* (NY); Sierra de Anafe, *Leon 7575* (NY), *Wilson and Leon 2849* (NY), *Leon and Roca 7133* (NY); Managua, *Van Hermann 1294* (FM); Jamaica, Loma de Somorrostro, *Leon and Roig 11455* (NY). Pinar del Río: Sierra de Anafe, *Wilson 11496* (FM, NY, US), *Wilson and Leon 11300* (NY, US), *Wilson and Leon 11547* (NY), *Leon 2829* (NY); Sierra Mendoza, *Shafer 11130* (NY); Guanajay, Mt. San Gabriel, *Van Hermann 250* (FM, NY); Guanajay Mt., *Baker and Van Hermann 4265* (FM, NY), *Baker and Van Hermann 4273* (FM, NY). HAITI: Petit-Goave, Chapelle St. Michel, *Ekman 6602* (US); Gd. Goave, Morne Descassiers, *Ekman 9535* (US).

Specimens of *Mappia racemosa* exhibit an enormous series of variations in leaf size, shape and texture. Accompanying variation in the pubescence of the ovary and the disk has made attempts to define the limits of this species hazardous. I have available for study material from Cuba, Porto

<sup>1</sup>This collection is a mixture. One sheet at the Gray Herbarium bears both var. *typica* and var. *brachycarpa*. The latter has not been recorded from the Oriente in recent collections and it is quite possible that this specimen has been added to the sheet without notation being made of that fact. The collection of *Wright 1389* must also be a mixture as Grisebach cites this number as the type for var. *brachycarpa*; however, the cited sheet from NY is var. *typica*.

Rico, Jamaica, Haiti, and Panama. The original figure and description by Jacquin was from a cultivated plant whose country of origin was unknown. Baehni and others have concluded it came from Jamaica. MacFayden described an *Ikacina dubia* from Jamaica which Miers reduced to the synonymy of *M. racemosa*. In 1866 Grisebach described a variety, from the collections of Wright from Cuba, on the basis of a character in the fruit. Grisebach had indicated this variety earlier (Pl. Wright. 1:191. 1860), without naming it. The variety is well marked and appears to be the common representative in the numerous recent collections from Cuba. The third name applied here is *Mappia affinis* Miers which was believed distinct, by that botanist, on the absence of axillary pores. These pores are usually present but vary considerably in degree of development. Often they are 3 mm. in diameter with orifices of 1 mm. or more, but as frequently they are scarcely noticeable and may have orifices visible only with a lens. There is no mention of the nature of the leaf apex in Miers' description, but I presume from the lanceolate shape that it is identical with var. *typica*.

Fawcett and Rendle describe and figure this plant as having a glabrous ovary and disk, as did Jacquin. After closely examining duplicates of the collections cited by Fawcett and Rendle, I have found that not all specimens have the glabrous condition. Actually a sparsely pubescent ovary and disk is by far the more common condition. The most reliable characters for distinguishing between the typical form and var. *brachycarpa* are in the fruits. The resemblance of the fruit of the Jamaican plants to that of *Leretia* is striking. They are remarkably similar in shape and structure; however, the fruits of *Leretia* are several times larger. In var. *typica* the drupe is flattened, rounded to an umbonate acute apex and narrowed to a cuneate base. The exocarp and mesocarp are thin and not fleshy. In dried condition these fruits never have the mesocarp distorted or squashed by pressing.

In var. *brachycarpa* the pistil and disk are usually densely strigose or hirsute with the hairs on the margin of the disk or, if extremely abundant, on the inside as well. The pubescence of the pistil is uniform and usually quite dense. This may approach the style or the style may be glabrous. The fruit is rounded at the base and subglobose in form, seldom tapering to the degree where it could be confused with var. *typica*. The mesocarp is fleshy so that, in practically all of the specimens I have seen, it has been squashed in pressing and the fruit is in an imperfect condition. The putamen is essentially smooth outside and is thicker than the more tenuous endocarp found in var. *typica*.

The occurrence of var. *typica* in Jamaica and the Oriente province of Cuba is supplemented by a recent collection from Panama. Except in the size of the leaves, which may be to 30 cm. long, these flowering specimens cannot be satisfactorily distinguished from var. *typica*. Therefore, until the fruit is known, it is advisable to place this collection here, even though the pistil and disk are more pubescent than the average. A collection from Porto Rico is also to be placed here. The leaves of this flowering specimen

are 14–19 cm. long and 6–8 cm. broad with both ends tapering and the apex sharp pointed. The pistil is sparsely pubescent with the disk glabrous.

Ekman's specimens from Haiti, cited in his flora, are both sterile but appear to be close to var. *brachycarpa*. So few collections are available from the Antilles outside of Cuba that an attempt must be made not to over-emphasize the differences in appearance of these collections until enough material is available to evaluate them correctly. Jack collected a large series of plants from one locality in Santa Clara province of Cuba and these numbers show the remarkable differences which might be expected in the species.

Both varieties appear to be plants of higher altitudes between 1500 and 3600 feet.

### Species Excluded

*Mappia origanoides* (L.) House, Amer. Midl. Nat. **8**: 62. 1922 = *Satureja origanoides* L.

*Mappia philippinensis* Merr. Phil. Journ. Sci. **26**: 467. 1925 = *Apodytes cambodiana* Pierre.

*Mappia senegalensis* (Juss.) Baill. Hist. Pl. **5**: 277. 1874 = *Icacina senegalensis* Juss.

### Nothapodytes Blume

*Nothapodytes* Blume, Mus. Bot. Lugd.-Bat. **1**: 248. 1850; Baillon, Adansonia **3**: 90. 1862–3.

*Neoleretia* Baehni, Compt. Rend. Soc. Phys. Hist. Nat. Genève **53**(1): 33. 1936; Candollea **7**: 177. 1936.

*Mappia* Jacq. Sect. *Trichocrater* Miers, Ann. Mag. Nat. Hist. II. **9**: 395. 1852; Engl. Nat. Pflanzenfam. III. **5**: 249. 1893.

Trees and shrubs, branches usually angular; leaves alternate or subopposite, the margins entire, subrevolute; petioles broadly and shallowly canaliculate; inflorescence terminal, rarely axillary, cymose or corymbose, flowers articulated to short ebracteate pedicels; calyx cupular, slightly five-toothed or lobed; petals 5, valvate, strigose or rarely short papillate-pubescent without, villose within, inflexed apex usually glabrous; stamens 5, free or rarely cohering by pressure to the base of the petals, the anther sacs ovate, longitudinally dehiscent, introrse, diverging at base, separate throughout their length, with a basal abaxial reflexed pulviniform appendage more or less cohering to the filament, connective about one-half the length of the anther, the filament fleshy, filiform, commonly flattened and slightly dilated at base, incurved at apex and attached dorsally to the anthers at the base of the connective; pistil symmetrical, the ovary hirsute, the style filiform to stout, the stigma capitate, truncate or oblique, the disk fleshy foliaceous, hirsute or glabrous within and on the edge, glabrous without, ovary one-celled, ovules two, anatropous, pendant from near the apex; drupe with a thin, rugose or smooth putamen, seed one, albuminous.

TYPE SPECIES: *Nothapodytes montana* Blume.

DISTRIBUTION: India, Malaysia, and the Philippine Islands.

### Key to the species

Disk glabrous.

Leaves glabrous, obovate to lanceolate, base cuneate, costa horizontal; inflorescence commonly axillary, stigma oblique. Java ..... *N. montana*

Leaves sparsely hirsute, elliptic to oblong-elliptic, base acute, veins gracefully arcuate; inflorescence terminal, usually two to the shoot apex, stigma truncate, concave. China (Yunnan), Siam . . . . . *N. dimorpha*

Disk pubescent.

Lamina unequal at base, leaf scars lunar or triangular, conspicuous, petiole to 5 cm. long; young branches strigose; calyx not ciliate, petals short strigose outside, disk hirsute on the margin and inside; drupe with rounded apex, putamen rugose, endosperm with a foetid odor, embryo about one-half the length of the seed. India and Malaysia . . . . . *N. foetida*

Lamina equal at base, leaf scars circular, inconspicuous, petioles short, 1–2.5 cm. long. Leaves attenuate at apex, petiole 1–2 cm. long; branches strigose; calyx ciliate-margined, petals commonly short-papillate without at apex and on margins, disk glabrous on margin; drupe umbonate at apex, slightly flattened, putamen rugose, endosperm with foetid odor, embryo about one-half the length of the seed. Southwestern China . . . . . *N. pittosporoides*

Leaves rounded at apex, petiole 1–2.5 cm. long; branches glabrous; calyx not conspicuously ciliate-margined, petals densely short-strigose without, disk conspicuously ciliate on margin; drupe rounded at apex, rarely slightly flattened, putamen smooth, endosperm not foetid, embryo nearly as long as the seed. Hainan . . . . . *N. obtusifolia*

**Nothapodytes montana** Blume, Mus. Bot. Lugd.-Bat. **1**: 248. 1850.

*Mappia montana* Miers, Ann. Mag. Nat. Hist. II. **9**: 398. 1852; Contrib. **1**: 67. 1851–61; Miq. Fl. Ind. Bat. **1**: 790. 1856; Valetton, Crit. Overz. Olac. 183. 1886; Koorders and Valetton, Bijdr. Booms. Jav. **5**: 143. 1900; Koorders, Excurs. Jav. **2**: 532. 1912.

Small tree; leaf blade obovate to lanceolate, 10–14 cm. long, 3.5 cm. broad, thinly coriaceous, dark and shining above, paler beneath, glabrous, apex obtusely acuminate, blade attenuate to a cuneate base, veins prominent, reticulate, costa horizontal; inflorescence corymbose, axillary or terminal, pedicels short, ebracteate; buds sericeous; calyx cupular, obscurely five-toothed, persistent; petals linear; stamens with filiform filaments, the anthers oblong, dorsally affixed; pistil hirsute, the ovary ovoid, the style filiform, the stigma capitate, oblique, emarginate, the disk fleshy, lobed, glabrous on both sides; drupe fleshy, ellipsoid, one-seeded. (Description compiled from Blume and Valetton.)

TYPE LOCALITY: Western Java.

ILLUSTRATION: Valetton, Crit. Overz. Olac. *pl.* 5, *fig.* 28. 1886.

DISTRIBUTION: Valetton (l.c. 183) reports this species from Sumatra in addition to the type locality in Java.

I have seen no material of this species. The type was in the herbarium at Leiden, and Koorders and Valetton apparently saw a second collection.

Blume described this as the type species of a new genus. Miers reduced the genus and placed *Nothapodytes* in *Mappia* as a subgenus. Bentham and Hooker referred it to *Apodytes*; however, Beccari disagreed and considered the species under *Mappia*. Engler has followed Miers. Baehni concluded the species could not belong either in *Apodytes* or *Mappia* but he failed to recognize its similarity to his new genus *Neoleretia*. Sleumer has shown these two genera to be the same and referred the species of *Neoleretia* to the genus *Nothapodytes*.

There is an important difference between the descriptions of Miers and Valetton. Miers reports the disk around the pistil to be long-pubescent on

the inside. Valetton reports and figures the disk as glabrous. Obviously another report is needed from someone who has access to this material. If it is glabrous, as Valetton reports, the species is similar to *N. dimorpha*, yet the other characters maintain the identity of each species. If, however, the disk is hirsute, the plant would closely approach the condition found in *N. obtusifolia* and perhaps *N. pittosporoides* and may replace one or the other.

**Nothapodytes dimorpha** (Craib) Sleumer, Notizbl. **15**: 247. 1940.

*Mappia dimorpha* Craib, Kew Bull. **1926**: 347. 1926.

*Neoleretia dimorpha* Baehni, Candollea **7**: 178. 1936.

Tree to 10 m., stems terete but longitudinally striate and ridged, young branches hirsute, becoming glabrate; leaves alternate, or opposite at the terminal dichotomies of the shoots; petioles 3–5 cm. in length, wiry, deeply canaliculate above, sparsely hirsute; lamina elliptic to oblong-elliptic, 18 cm. long to 8.7 cm. broad, membranaceous, paler in color below, apex acuminate, base acute, midrib and veins densely short-pilose or crispate above, slightly prominent, sparsely to densely hirsute below, the veins 8–10 pairs, prominent, gracefully arcuate, anastomosing near margin, the margin ciliate; inflorescence terminal, frequently two from the shoot apex, the axis appressed-crispate or strigose; calyx campanulate, 3 mm. in diameter, 2 mm. high, moderately lobed, the lobes to 0.8 mm. high, sparsely strigose; petals oblong, 4.5–6 mm. long, 1.2–1.5 mm. broad, densely strigose without, pilose within except at apex and base, inflexed tip 0.3 mm. long, frequently papillate; stamens 4.2–4.4 mm. long, the filaments slender, fleshy, 3–4 mm. long, the anther sacs 1–1.2 mm. long; pistil 4–4.5 mm. high at anthesis, the ovary 1–1.4 mm. in diameter, sparsely to densely hirsute, the style 2–2.8 mm. long, glabrous, the stigma capitate, truncate or concave at apex, the disk fleshy, crenulate-margined, frequently deeply lobed, glabrous, to 1 mm. in height; fruit not known.

TYPE LOCALITY: Sukotai, Siam.

ILLUSTRATION: Plate III.

DISTRIBUTION: Siam, China (Yunnan).

CHINA: Y u n n a n : Hills of Tso-si, *Maire* 239 (A).

The cited specimen consists of several flowering branch tips with a single mature leaf. The leaf is only 9 cm. long and 4.5 cm. broad with a petiole of 1.9 cm., much smaller than that cited for the type. However, all other characters are in agreement. This plant is also unusual in possessing two inflorescences at the apex of the shoot with the subtending leaves opposite. These inflorescences, with pedicels of 2 cm. and a diameter of 2 cm., are much smaller than those Craib described. Maire reports that the flowers are yellow and that the plant was collected at an altitude of 2450 m.

My material is inadequate and I have been forced to adopt my description from that given by Craib.

**Nothapodytes pittosporoides** (Oliv.) Sleumer, Notizbl. **15**: 247. 1940.

*Mappia pittosporoides* Oliv. in Hook. Ic. **18**: pl. 1762. 1888.

*Neoleretia pittosporioides* Baehni, Candollea **7**: 178. 1936.

Woody bush or rarely a tree, 1.5–5 m. tall, branches mostly green, terete, rarely angular, the leaf scars not conspicuous, circular, the youngest

branches strigose, becoming glabrate; petioles 1–2.2 cm. long, broadly sulcate above, commonly strigose at least in the sulca; lamina oblong or commonly oblanceolate, 10–15 cm. long, 2–4.5 cm. broad, thinly coriaceous, dark green and frequently shining above, lighter below, commonly turning black on drying, when young densely golden-strigose especially beneath, the midribs and veins commonly light yellow in color, commonly hirsute, glabrate at maturity, the veins 6–8 pairs, weakly developed and anastomosing; inflorescence axis frequently flattened, hirsute; calyx campanulate, 3 mm. in diameter, membranaceous, ciliate on margins and sparsely strigose without, five-toothed, teeth deltoid, to 1.2 mm. long, increasing slightly in fruit; petals oblong, 6.3–7.4 mm. long, 1–2.1 mm. broad, inflexed apex fleshy, 1 mm. long, strigose without, commonly papillate on apex and margins, long-villose within; stamens 5–6 mm. long, the filaments 4–5 mm. long, slightly thickened at base, the anthers ovate, 1–1.3 mm. long; pistil 3.5–4 mm. high, disk fleshy, irregularly lobed or deeply crenulate, glabrous without and on margin, sparsely hirsute within, persistent in the fruit, the ovary evenly hirsute, 1.1–1.4 mm. diameter at anthesis, indistinctly truncated; drupe ellipsoid to oblong-ovoid, slightly flattened, 1–1.8 cm. long, 0.6–0.8 cm. in diameter, distinctly umbonate at apex, commonly minutely pubescent at maturity, the putamen thin, rugose, the endosperm with noticeable foetid odor, the embryo about one-half the length of the seed, the cotyledons ovate, 4.5 mm. long, 3.5–4 mm. broad, the radicle cylindrical, 2 mm. long.

TYPE LOCALITY: Ichang, Hupeh, China.

ILLUSTRATIONS: Hook. Ic. **18**: *pl.* 1762. 1888; Baehni, *Candollea* **7**: *pl.* 4, *fig.* 2, *A–B.* 1936.

DISTRIBUTION: Western China (Hunan, Hupeh, Kwangtung, Kweichow, Szechuan).

CHINA: H u n a n : Hsikwangschan, Hsinhwa, *Handel-Mazzetti* 778 (A); Yang-Shan Changning Hsien, *Fan and Li* 179 (A). H u p e h : Ichang, *Henry* 3990 (type coll. NY), 3536 (A, G, US), 3537a (G), 4118 (A, G, US); Hsing-shan, Chang lo Hinen, *Wilson* 3296 (A, G, US). K w a n g t u n g : Yu-yuen, *Ko* 52863 (A). K w e i c h o w : Liang Feng Yah, *Steward, Chiao and Cheo* 241 (A, NY, US). S z e c h u a n : Mt. Omei, *Wilson* 4945 (A), *Wang* 23215 (A); Mt. Weol, *Wilson* 4440 (A); Mt. Wal, *Wilson* 3295 (A, G, US); Kientschang, *Handel-Mazzetti* 1047 (US); Yu-chi k'on, *Smith* 2360 (A); no locality given, *Wilson* 3234 (A).

This species is limited to western China. Handel-Mazzetti reports its habit to be rocky slopes or cliffs, Wilson reports thickets, and Steward mentions wooded slopes. The substratum, according to Handel-Mazzetti, is usually calcareous or schistose. The species grows at an altitude of from 650–1750 m. and is a bush (60 cm. ex Handel-Mazzetti) or a small tree (5–10, rarely to 20, feet, ex Wilson). The oblanceolate leaves are usually clustered at the apex of the shoots. The inflorescence has fewer flowers than most species of the genus, and these flowers are yellow and have a foetid odor resembling that of *N. foetida*. This odor is also present in the endosperm of the seed. The fruit is red when mature and usually turns black on drying. The calyx enlarges slightly with the fruit and remnants of the disk are also present. The endosperm is divided into two concentric zones with the outer usually of a harder consistency.

**Nothapodytes obtusifolia** (Merrill) comb. nov.

*Mappia obtusifolia* Merr. Lingnan Sci. Jour. **14**: 28. 1935.

Woody bush or tree, 3–24 m. in height, diameter of trunk to 35 cm., the bark gray, the branches terete, glabrous; leaves alternate, the upper ones frequently aggregated near the tip of the shoot, almost opposite; the petioles 1.2–2.5 cm. long, terete or obscurely flattened, glabrous, olive-brown in color, the lamina oblanceolate-oblong or rarely oblong, 9–18 cm. long, 3–6.5 cm. broad, chartaceous to thin-coriaceous, olive green on both sides, not darkening on drying, glabrous, apex obtuse or rounded, base cuneate to acute, the veins 7–8 pairs, only slightly and equally developed on both sides of the midrib, forking abruptly midway to the margins, laxly reticulate; cymes 3–5 cm. broad on peduncles 3–4 cm. long, the axes slightly flattened, moderately strigose; calyx campanulate or spreading, 2–2.3 mm. in diameter, 1.5 mm. high, strigose on surface and slightly so on margins, weakly 5-toothed; petals oblong to lanceolate, 6.9–7.2 mm. long, 2.1–2.5 mm. broad, densely short-strigose without, weakly hirsute within, the inflexed tip 0.5 mm. long; stamens 5.5–6.4 mm. long, the anther sacs ovate-oblong, 2–2.7 mm. long and 1.5 mm. wide, the filament 4–5 mm. long; pistil 3–3.7 mm. high, the ovary 1 mm. in diameter, hirsute, the style stout, 2 mm. long, more or less hirsute but commonly glabrous below the stigma, the stigma oblique, bilobed, the disk thin, fleshy, 0.3 mm. high, glabrous without but densely ciliate on margin, hirsute within, margin crenulate, never lobed; drupe oblong-ovoid, 9–13 mm. long, 6–9 mm. in diameter, circular in cross-section, rarely flattened, moderately hirsute when young, becoming glabrate, the putamen thin, almost smooth; seed 7.8–9 mm. long, the ovate cotyledons 5.2–6 mm. wide, cordate at base, strongly three-nerved, the radicle cylindrical, 2.3 mm. long.

TYPE LOCALITY: Ngai district, Hainan.

ILLUSTRATIONS: Merrill, Lingnan Sci. Journ. **14**: 29. 1935.

DISTRIBUTION: China (Hainan).

CHINA: H a i n a n : Yaichow, alt. 1700 feet, *How* 70623 (A, NY, US); alt. 1100 feet, *Chun and Tso* 44674 (A, NY, US); Yai-hsien, *Lau* 5794 (A); Naam Shan Leng, Ngai district, *Lau* 233 (type NY, US).

This plant is reported to have fragrant flowers and so is quite in contrast with *N. foetida* and *N. pittosporoides*. The fruit is red and the endosperm lacks the foetid odor found in the other species. This species was overlooked by both Baehni and Sleumer.

**Nothapodytes foetida** (Wight) Sleumer, Notizbl. **15**: 247. 1940.

*Stemonurus foetidus* Wight, Ic. **3**: 955. 1843–5.

*Mappia foetida* Miers, Ann. Mag. Nat. Hist. II. **9**: 395. 1852.

*Mappia oblonga* Miers, l.c. 396.

*Mappia ovata* Miers, l.c. 396.

*Mappia Gardneriana* Miers, l.c. 396.

*Mappia Championiana* Miers, l.c. 397.

*Mappia Wightiana* Miers, l.c. 397.

*Mappia tomentosa* Miers, l.c. 397.

*Mappia tomentella* Miers ex Valetton, Crit. Overz. Olac. 183. 1886.

*Mappia cambodiana* Pierre, Fl. For. Cochinch. **17**: 267. 1892.

*Neolaretia foetida* Baehni, Candollea **7**: 177. 1936.

Trees to 15 m. in height; branches conspicuously angular with large triangular leaf scars; petioles 1.4–5.3 cm. long, averaging 3 cm., strigose espe-



cially in the sulca; lamina variably elliptic-ovate or lance-oblong, 10–20 cm. long, 5–12 cm. broad, membranaceous or moderately coriaceous, at least the young leaves turning black on drying, sparsely pubescent above, glabrate below or sparsely pilose with the veins hirsute or tomentose, attenuate at apex, the base attenuate or rounded, unequal, the nerves 7–8 pairs, prominent below, scarcely evident above, the peduncles and rachises of inflorescences flattened or angled, crispose- or strigose-pubescent; calyx campanulate, 2.4–3 mm. in diameter, the five teeth rarely exceeding 0.2 mm. in height, strigose or glabrate; the petals lance-oblong, 4.2–5 mm. long, 1.5–1.8 mm. broad, appressed-strigose without, villose within, the inflexed apex with short-villose pubescence; the filaments 3.1–4 mm. long, the ovate anther sacs 1–1.2 mm. long, the disk slightly lobed, glabrous without, hirsute on the margin and inner surface, 0.2–0.3 mm. high, the ovary 1–1.5 mm. in diameter at anthesis, densely hirsute or pubescent in definite lines, the style stout, 1.1–1.4 mm. long, densely hirsute to glabrate, the stigma capitate, truncate or bilobed and oblique; drupe oblong-ovoid, 1–2 cm. long, 0.8–1 cm. in diameter, black, commonly minutely pubescent, the putamen thin and woody, the endosperm with a foetid odor, the embryo usually one-half the length of the seed, the cotyledons ovate, usually displaced laterally, their margins not superimposed.

TYPE LOCALITY: Nilgiri Hills, India.

ILLUSTRATIONS: Pierre, Fl. For. Cochinch. **17**: 267, as *Mappia cambodiana*. 1892; Beddome, Fl. Sylv. t. 141. 1871; Brandis, Indian Trees, fig. 70. 1915; Fyson, Fl. South India Hill Stations **2**: t. 81. 1932; Fyson, Fl. Nilgiri and Pulney Hill-tops **2**: 58. 1912; Baehni, Candollea **7**: pl. 4, fig. 2, D–F, as *Mappia foetida*. 1936; Wight, Ic. Pl. Ind. Or. **3**: 955. 1843–5; Spicil. Neilgher. **1**: 23, as *Stemonurus foetidus*. 1851; Valetton, Crit. Overz. Olac. pl. 5, fig. 26. 1886; Talbot, For. Fl. Bombay **1**: 266, as *Mappia oblonga*. 1909; Miers, Contrib. Bot. **1**: pl. 8. 1851–61; Valetton, Crit. Overz. Olac. pl. 5, fig. 27, as *Mappia ovata*. 1886; Schnizl. Icon. **4**: 233a, figs. 9–11, as *Mappia tomentosa*. 1886.

DISTRIBUTION: Southern India (Western Ghats, Mysore), Ceylon, Cambodia, Botel Tobago.

SOUTHERN INDIA: Penn. Orient., Wight 431 (G, NY); Nilgiri hills, King (US 263706); Gardner (NY); Hooker and Thomson (G); Ootacamund, Oct. 17, 1921, Wilson (A), Oct. 16, 1921, Wilson (A); Pulney hills, Kodaikanal region, Anglade collection s.n. (A); Malabar, Concan, etc., Stocks, Law, etc., Hooker and Thomson Herb. (G). CEYLON: Gardner 98 (G, type coll. of *Mappia Gardneri*); Gardner 99 (G, NY, type coll. of *Mappia ovata*); Thwaites 492 (G, NY); near Badulla, Silva 24 (NY). BOTEL TOBAGO: Feb. 7, 1920, S. Sasaki (A).

This range is extremely wide. I have not seen the Cambodian material of Pierre. The plant from Botel Tobago was misidentified in the herbarium, this fruiting specimen is very similar to specimens of *N. foetida* from Ceylon and India, particularly those of Gardner 99, Silva 24, Wight 492, and Wilson s.n. cited above. More collections from the middle of this range with more detailed habitat and altitude notes are quite desirable.

NATIVE NAMES: Stinking may tree, gur, halgur, ganera (Nairne); stinking lamp, Ganda pang (Miers); gandapana (Trimen); gandaoanapas (Thwaites); Kodsā, hedare (Talbot); ghānera (Cooke); Kala gaura, Arali (Brandis).

The majority of writers since Miers have tended to lump *M. Gardneriana*, *ovata*, *tomentosa*, and *cambodiana* under *foetida* as the specific differences

are poor. Thwaites and Trimen considered them, in part, as varieties.

In the course of the present study differences were observed, in the material at my disposal, which have not been mentioned in the literature. The significance of these differences cannot be determined from limited material but it is deemed advisable to indicate them.

The species here included were established on the basis of leaf size, shape and pubescence. These are acknowledged to be variable by Trimen, Thwaites, Baehni, Fyson, Wight and others. For example, the glabrate petiole may vary in length, in one specimen (*Gardner 99*, isotype of *M. ovata*) from 1.5 cm. to 5 cm., but the average length for petioles of this complex is 3 cm. In my material the base of the leaf is always unequal and the pubescence is deciduous upon maturity of the leaf. Most of the juvenile leaves are pubescent on both surfaces. The midribs and veins alone possess hairs on the upper surface of the older leaves and on the lower surfaces bear more hairs than the lamina. In the specimens I have seen which had been identified as *M. tomentosa* the pubescence is dense and crispose with the hairs limited to the veins and veinlets. In *Gardner 98* tufts of hairs are present in the axils of the veins and the midrib in mature leaves. The pubescence on the inflorescence is more striking, as it is variable in length and color as well as density of the hairs. The calyx teeth show extremes of development and of indument. The pubescence on the inside of the petals is late in developing. If the buds are small the hairs may be entirely suppressed and an uneven development may occur if the stamens are tightly appressed to the petals. Thus it is possible, at different stages of petal- and bud-development, to have long and apparently fully developed hairs in some portions and glabrous areas in other regions of the petals. When mature the petals are reflexed and, usually, the indument is uniformly developed. The stamens are commonly as long as the petals. In *Gardner 98*, however, the filaments fail to elongate and the pollen content of the thecae is much reduced.

Pierre makes no mention of a disk in his description, nor does he figure it in the plate of *M. cambodiana*. Baehni, however, examined authentic material, and so I assume that the synonymy is correct.

All fruits of this group are pubescent when young. This may persist to maturity or the fruit may be strictly glabrate when mature. A thin, commonly rugose, putamen exists in this group which has two ridges developed lateral to the funicle. The single seed usually fills the locule but the remnants of the other ovule may frequently be found. There is a differentiation of the foetid endosperm into a hard and usually darker outer layer and a lighter colored but frequently even harder inner layer. The lateral displacement of the cotyledons is of particular interest. In *Thwaites 492* the cotyledons are regularly orbicular in shape and only slightly displaced laterally. In the *Stocks, Law* specimen the cotyledons have a very irregular or lobed shape and are greatly displaced with the median line of the cotyledon being as much as 30° to 45° from the center. In the *Anglade* specimen labelled *M. tomentosa*, the cotyledons are likewise strongly displaced,

but here the shape is regular, ovate or oblong. These variations in displacement and form appear in a regularly increasing series relative to the length of the seed; that is, the seeds of *Thwaites* 492 are ovoid and about as wide as long while those of the *Anglade* specimen are oblong and twice as long as wide. The *Stocks, Law* specimen is intermediate. I cannot determine the significance of this variation from the few fruiting specimens I have. Pierre says that Miers' species can be separated on leaf size and fruit characters, but does not elaborate on this statement. Neither Baehni nor Sleumer, who both lump Miers' species, comment on this. While the size of the fruit will vary on the same sheet (possibly stages of development), the embryo form, in those I have examined, is constant. The embryo, which is commonly as large as the seed, is usually oriented at right angles to the raphe. The funicle is flattened and is relatively thin. It is located in the mesocarp between projecting ridges of the putamen. It runs the length of the fruit in this manner and enters the locule very near the apex. The raphe descends the broad face of the seed, which is frequently slightly flattened, and terminates in a circular chalaza at the end opposite the micropyle.

The flowers are reported by Fyson to be "extraordinarily evil smelling." Miers says that the native name means "stinking lamp on account of the extremely foetid odor of the flowers." Gamble (*Fl. Pres. Madras* **1**: 196, 1915) has a key to the several species he recognizes, and distinguishes between these by the absence of a foetid odor in some. He also considers the texture of the leaves, i.e. membranaceous or coriaceous, as a significant difference and incorporates this in his key. Thwaites and Trimen have pointed out that this is a character varying with the altitude. Beddome also recognizes this and notes that the plants range in altitude from sea level to 7-8000 feet.

### Species Excluded

*Nothapodytes philippinensis* (Merr.) Sleumer, *Notizbl.* **15**: 247, 1940.

*Mappia philippinensis* Merr. *Phil. Journ. Sci.* **26**: 467, 1925.

*Ncoleretia philippinensis* Baehni, *Candollea* **7**: 80, 1936.

Both Baehni and Sleumer ignored the glabrous condition of the inner surface of the petals in this species and allowed it to remain in the *Mappia* complex. Through the kindness of the curator of the herbarium of the Philippine Bureau of Science I was able to borrow and examine the type specimen of this plant. It must now be referred to the synonymy of ***Apodytes cambodiana*** Pierre, *Fl. For. Cochinch. t.* 267, 1892.

### Humirianthera Huber

**Humirianthera** Huber, *Bul. Soc. Bot. Genève* **II**, **6**: 184, 1914; Baehni, *Candollea* **7**: 181, 1936.

Vines or shrubs with scandent branches, rhizomatous, the rhizomes or tubers large; leaves alternate, usually membranaceous, entire; flowers perfect, 5-parted, articulated at the base of the calyx to bracteate pedicels; calyx deeply lobed, the lobes frequently unequal in length; petals equal, ovate to lanceolate, valvate, appressed-pubescent without, villose or crispose-pubescent within, apex inflexed; stamens free, the filaments thickened at

base, attenuate towards apex and inflexed, the anther sacs subglobose to oblong, introrse, longitudinally dehiscent, the connective triangular, broadest at base and projecting beyond anther sacs; ovary hirsute, unilocular, the ovules two, anatropous, collaterally pendulous; style incurved, glabrous, the stigma small, capitate; fruit drupaceous, oval to globose, exocarp tenuous, mesocarp thick and fleshy becoming woody, the putamen housing a tubular funicular canal, the seed one, albuminous.

TYPE SPECIES: *Humirianthera ampla* (Miers) Baehni.

DISTRIBUTION: Brazil, Colombia, Venezuela.

Huber established this genus on material collected by Ducke in Brazil and gave the genus an appropriate name by indicating the superficial similarities of the stamens with those found in the Humiriaceae. The anther sacs of both the Humiriaceae and *Humirianthera* are small and diverge at the base. The connective is large and fleshy and characteristically continues past the anther sacs in a triangular extension. The filament is attenuate at the apex and inflexed before its attachment to the base of the connective. Neither Miers nor Engler mention these features in their description of *H. ampla*, although Baillón does. Apparently Valetón's work was overlooked by both Huber and Baehni, since he gives a good description of this connective and indicates the similarity to the Humiriaceae. Valetón maintained *H. ampla* as a species of *Leretia* as he was able to find in *L. cordata* a projection of the filiform connective as a slight tip beyond the oblong anther sacs. The width of this connective varies, and Valetón interpreted the condition found in *H. ampla* as an extreme development, i.e., widening and extension, of the sterile connective tissue. Baehni examined isotype material of *L. ampla* and *H. Duckei*, Huber's type species, and concluded that they were identical. I have only cited specimens of *H. Duckei* to compare with isotypes of *L. ampla* but I believe that Baehni is correct. The type species of the genus therefore, should be called *H. ampla* (Miers) Baehni.

The shape of the anthers is the single character upon which Huber and Baehni maintain this genus. While this character is most readily recognized, there are others which support the genus. The occurrence of stellate hairs is infrequent in the Icacinaceae and appears to be quite typical of the few genera which do have them. The presence of these clusters in *H. rupestris* and *H. crispula* and the tendency in *H. ampla* to have the hairs clustered is significant in characterizing the genus. The stellate cluster in *Humirianthera* consists of a single erect, thick, rugose-walled hair surrounded by a basal rosette of arching, smooth-walled hairs. The deeply lobed calyx, which is densely covered without with strigose or curved hairs, is easily recognized. The petals are strigose without and usually covered within with a dense tangled mat of crispose hairs or simply a dense pubescence of villose hairs.

Fruits are known only for *H. rupestris*. Since there is so little variation in the fruits within the genera of the Icacinaceae, it is safe to assume that those of the other two species will be similar when found. Ducke reports that the mesocarp is fleshy, but in a dried condition its texture is fibrous or

even woody. The putamen is smooth both inside and outside. The entire fruit is quite a bit larger than that found in any of the related genera, and the presence of single strigose hairs and stellate hair clusters on the mature fruit is characteristic.

The underground structures of the New World genera of the Icacinaceae are unknown. Such structures, especially of woody plants, are not readily obtained by collectors. There are, however, several reports of the root system of *Humirianthera* in the literature. Le Cointe, Ducke and others describe the plants as woody shrubs, or bushes, with rhizomes or tubers. The tuber may be up to 40 cm. in diameter and weigh nearly 100 kilos and, when powdered, may yield as much as 16 kilos of starch. These tubers contain a poisonous principle which is readily removed by repeated washings, after which the starchy material may be used for food. The fruits are reported to be the size of a hen's egg and these also contain starch. This type of underground system is unusual since most of the genera in this family are trees and shrubs. It is interesting to note that Hutchinson and Dalziel have reported similar tubers for *Icacina* in tropical West Africa and Engler found a similar underground system in *Trematosperma*. Hutchinson and Dalziel also describe a washing process for the *Icacina* tubers to remove the poison principle before they can be used. *Icacina* is reported to have a habit similar to that found in *Humirianthera* while *Trematosperma* is a true liana. This same type of underground system might be expected in several other genera of the Icacinaceae with a similar bushy scrambling habit.

The genus now contains three species. These are limited to South America and are found mainly in the Amazon basin. The plants are reported growing in open locations on the edges of both primary and secondary forests which are not inundated. The closest relationship of this genus is with *Leretia*.

#### Key to the species

Petals glabrous in the lower third of the inner surface, this region usually fleshy and swollen into a ridge or flap, the entire plant bearing a characteristic red-brown stellate pubescence; leaves rhomboid, widest at the middle, veins arcuate but weakly if at all anastomosing at the margins; inflorescence terminal. .*H. rupestris*

Petals pubescent almost to the base within, lacking the fleshy ridge or flap; veins of the leaves arcuate and strongly anastomosing at margin.

Inflorescence and leaves commonly simple-pubescent, becoming glabrate, hairs rarely gathered into small numbered clusters; pubescence on the inside of the petals straight or only slightly curly; leaves broadly lanceolate to elliptical, flat, base rounded; anther sacs when mature one-fourth to one-third the length of the anther . . . . .*H. ampla*

Inflorescence and leaves stellate-pubescent, hairs yellow-brown; inside of the petals densely curly-crispose to base; leaves elliptic to orbicular, midrib commonly arching so that the pressed leaves are frequently plicate, base slightly cordate; anther sacs when mature one-half to two-thirds the length of the anthers . . . . .*H. crispula*

**Humirianthera rupestris** Ducke, Arch. Jard. Bot. Rio 4: 118. 1925; Baehni, Candollea 7: 189. 1936; Le Cointe, Arvores e Plantas Uteis 457. 1934.

Scandent shrub, the rhizome an enormous starchy tuber; stems angular,

densely red-brown stellate-pubescent, lenticels minute and inconspicuous, the petioles 6–9 mm. long, stellate-pubescent; lamina rhomboid to ovate, 10–15 cm. long, 6–8 cm. broad, acuminate at apex, rounded at base, stellate-pubescent above and below especially on the veins and midrib; inflorescence axis sparingly stellate-pubescent or tomentose, bracts of the pedicels small, ovate, acute; calyx 4 mm. in diameter, the lobes triangular, acute, 1.3 mm. long, strigose-pubescent; petals ovate to oblong, 4.1–4.3 mm. long, 1.6–1.9 mm. broad, strigose without, villose within with a glabrous base, the center area protruding in a prominent fleshy ridge or flap, the apex inflexed; stamens one-half to two-thirds the length of the petals, the anthers 0.6 mm. long and 0.4 mm. wide, the anther sacs 0.1–0.2 mm. in diameter, the filament glabrous, 2.5–2.6 mm. long; ovary globose, 1.2 mm. high and 0.8 mm. in diameter, hirsute, the style less than one-half the length of the ovary, recurved; fruit broadly ovoid to globose, 5 cm. long and 4 cm. wide, densely stellate-pubescent, the mesocarp to 3 mm. thick, woody when dry, the putamen woody, smooth, to 0.7 mm. thick, the seed albuminous, the cotyledons ovate, thin, frequently folded or contorted.

TYPE LOCALITY: Pará, Brazil.

DISTRIBUTION: Amazonian Brazil.

BRAZIL: P a r á : Montealegre, Seru de Aroxy, on rocky ground, flowering in Dec. and fruiting in April, *Ducke 9969* (US); A m a z o n a s : Santa Isabel, Rio Negro, flowers yellow, *Ducke 342* (A, NY, US); Manáos, above Cochoeirinha, *Ducke 25288* (US).

NATIVE NAMES: Mandioca-assu (Le Cointe), Mandiocassu, maira (Ducke). The common name of false mandioc is probably derived from the starchy character of the rhizome.

**Humirianthera ampla** (Miers) Baehni, *Candollea* **7**: 182. 1936.

*Leretia ampla* Miers, *Ann. Mag. Nat. Hist.* III. **4**: 364. 1859; Valetton, *Crit. Overz. Olac.* 186. 1885.

*Mappia ampla* Engl. in *Mart. Fl. Bras.* **12**(2): 51. 1872.

*Humirianthera Duckei* Huber, *Bull. Soc. Bot. Genève* II. **6**: 184. 1914; Ducke, *Arch. Jard. Bot. Rio* **3**: 206. 1922; *op. cit.* **4**: 118. 1925; Le Cointe, *Arvores e Plantas Uteis* 457. 1934.

Rhizomatous shrub or bush, young branches somewhat angular, glabrous, lenticels oblong, conspicuous, much lighter in color than the stem; petioles 8–10 mm. long, glabrate; lamina broadly lanceolate to elliptical, 8–20 cm. by 3–10 cm., the apex obtuse to acuminate, the base nearly acute or rounded, the midrib and veins prominent below; inflorescence axillary or terminal, strigose; calyx patelliform, lobes 1.3–1.6 mm. long, lanceolate, densely hirsute without; petals ovate-lanceolate to ovate, 3.5–4.3 mm. long, 1.4–2 mm. broad, almost equal, strigose without, villose, tomentose or rarely crispose within, the inflexed apex glabrous; filaments 2–3 mm. long, the anther sacs globose, connective tapering to an extended apex 0.6–0.8 mm. long; ovary globose, 1 mm. in diameter at anthesis, hirsute; the style 0.7 mm. long, glabrous, slightly incurved; fruit unknown.

TYPE LOCALITY: Near San Carlos on the Rio Negro, Venezuela.

ILLUSTRATION: Valetton, *Crit. Overz. Olac. pl. 5, fig. 31.* 1886.

DISTRIBUTION: Amazonian Venezuela and Brazil.

VENEZUELA: A m a z o n a s : San Carlos on the Rio Negro, *Spruce 3776* (FM, G, NY). BRAZIL: P a r á : Obidos, *Ducke 20633* (US); Trombetas, Rio Cumina-

mirim, *Ducke 14843* (US); Faro, *Ducke 8638* (US); A m a z o n a s : Itacoatira, *Ducke 12479* (US).

NATIVE NAMES: Maria, Apolo (Ducke), Mandioca ossu (Le Cointe).

The numerous collections of *Spruce 3776* show a large range of leaf size for this species. The average size seems to be 5–10 cm. long and 7–13 cm. wide, although a photograph of the type sheet shows one leaf with dimensions of 20 cm. by 10 cm., which agrees with the figures published by Engler. This Spruce collection is commonly reported from Brazil; however, it was made in adjacent Venezuela, as verified in Spruce's account of his trip as reported by Wallace.

***Humirianthera crispula* sp. nov.**

Frutex usque ad 1–2 m. altus, ramis gracilibus, ramulis novellis teretibus sparse fulvo-stellato-pilosis; laminis foliorum ellipticis, orbicularibus vel ovatis, 9–13 cm. longis, 6–8 cm. latis, membranaceis, subtus dense pilosis (pilis non raro fasciculatis), apice obtusis vel raro acutis, basi rotundatis usque subcordatis; costa supra strigosa subtus prominenter strigosa pilis paucis stellatis ornata, venis primariis 4–5 arcuatis subtus prominulis supra sparse piliferis; cymis axillaribus aut terminalibus, laxis, ramulis hirsutis pilis stellatis ornatis; floribus usque ad 5 mm. latis; calyce late campanulato 4 mm. diametro, lobis oblongis abrupte acuminatis 1.4–1.8 mm. longis, 0.8–1 mm. latis, dense strigosis; petalis sub anthesi lanceolatis, maturitate ovatis, 4 mm. longis, 1.1–1.4 mm. latis, extus dense strigosis intus imo ad basim crispe pilosis; staminibus 2.5–3.2 mm. longis; antheris ovatis vel oblongis apice divergentibus 0.5 mm. longis, connectivo triangulari apicem antherarum 0.4 mm. superante, haud incrassato, filamentis maturis ca. 2–2.6 mm. longis filiformibus, apice attenuatis inflexis; ovario ovoideo dense strigoso, stylo brevi ovarium subaequante glabro recurvato; fructu ignoto.

COLOMBIA: B o y a c á : "Mercedes" on Cano Canacabure, about 10 km. above the mouth, alt. 180 m., flowers yellow, inodorous, abundant on savannah at edge of forest, Feb. 20, 1939, *Haught 2619* (TYPE US, isotype G).

The inflorescence in this species appears to be developed terminally, and by subsequent growth of a lateral shoot it assumes an axillary position. The cyme is up to 8 cm. high and 15 cm. wide. The petioles of the leaves are only slightly canaliculate above and become noticeably corky in age. They are sparsely stellate-pubescent and between 7 and 10 mm. in length. This collection from Colombia represents the first of the genus from that country. *Humirianthera crispula* is closest to *H. ampla*.

## EXPLANATION OF PLATES

## PLATE I

*Mappia mexicana* Robins. & Greenm. Pringle 5094.

Fig. 1. Habit,  $\times \frac{1}{2}$ ; 2. Longitudinal section of the pistil,  $\times 14$ ; 3. Fruit,  $\times \frac{1}{2}$ ; 4. Longitudinal section of the fruit,  $\times \frac{1}{2}$ ; 5. Longitudinal section of the seed,  $\times \frac{1}{2}$ ; 6. Pistil, showing the glabrous ovary and disk,  $\times 14$ ; 7. Side view of a petal,  $\times 11$ ; 8. Adaxial surface of a petal, showing the reduced amount of pubescence,  $\times 11$ ; 9. Habit sketch of a partly opened bud, showing the glabrous outer surface of the petals, the slightly pubescent calyx teeth, the glabrous ebracteate pedicels, and the floral articulation,  $\times 9$ ; 10. Portion of a mature stamen showing the filament and connective after the anther sacs have fallen,  $\times 16$ ; 11–13. Lateral, abaxial, adaxial views of the stamens showing the basal attachment of the filament and the connective,  $\times 16$ .

## PLATE II

Figs. 1–3. *Mappia angustifolia* Griseb. Wright 2638.

Fig. 1. Habit,  $\times \frac{1}{2}$ ; 2. Adaxial surface of the petal, showing aggregation of pubescence in the lower portion,  $\times 10$ ; 3. Pistil, showing the hirsute ovary but glabrous disk,  $\times 17$ .

Figs. 4–13. *Mappia racemosa* Jacq. var. *brachycarpa* Griseb. Jack 6979.

Fig. 4. Habit,  $\times \frac{1}{2}$ ; 5. Pistil, showing the hirsute ovary with a disk ciliate on the margin,  $\times 11$ ; 6. Side view of fruit showing the rounded base,  $\times \frac{1}{2}$ ; 7. End view of fruit,  $\times \frac{1}{2}$ ; 8. Longitudinal section of the seed,  $\times \frac{1}{2}$ ; 9. Ovarian disk with the pistil removed, showing the pubescence on the margin and the inside,  $\times 20$ ; 10. Pistil with ovarian disk removed, showing the glabrous base,  $\times 11$ ; 11–13. Lateral, abaxial, and adaxial views of the stamens,  $\times 9$ .

## PLATE III

*Nothapodytes dimorpha* Craib. Maire 237.

Fig. 1. Habit,  $\times \frac{1}{2}$ ; 2. Pistil, showing the hirsute ovary and glabrous disk,  $\times 10$ ; 3. Adaxial surface of a petal showing the inflexed apex, papillate hairs on the outer surface and the short clavate hairs inside,  $\times 9$ ; 4. Bud, showing the lobed calyx,  $\times 6$ ; 5–7. Adaxial, lateral, and abaxial views of the stamens, showing the dorsal attachment of the filaments to the connective, the arching of the filament behind the anther, and the reflexed basal lobes of the anther tissue connected to the filament,  $\times 11$ .

## PLATE IV

*Humirianthera crispula* Howard. Haught 2619.

Fig. 1. Habit,  $\times \frac{1}{2}$ ; 2. Open flower, showing the bracteate hirsute pedicel and the floral articulation below the calyx,  $\times 8$ ; 3. Mature recurved petal with extended tip showing the even crispose pubescence on the inside; note the change of shape from Fig. 4,  $\times 7$ ; 4. Petal taken from bud,  $\times 7$ ; 5. Side view of a petal,  $\times 7$ ; 6. Basal view of the expanded calyx,  $\times 7.5$ ; 7. Stellate cluster of hairs showing the rugose surface of the erect center hair and the smooth-walled arching hairs surrounding it,  $\times 50$ ; 8. Mature pistil showing the glabrous recurved style and hirsute ovary,  $\times 18$ ; 9. Para-sagittal section of the ovary showing the two pendant anatropous ovules,  $\times 18$ ; 10–12. Lateral, abaxial, and adaxial views of the stamens taken from a bud,  $\times 13$ ; 13–15. Adaxial, abaxial, and lateral views of the stamens from an opened flower; note the broad connective with the anther sacs diverging from the top,  $\times 11.5$ .

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